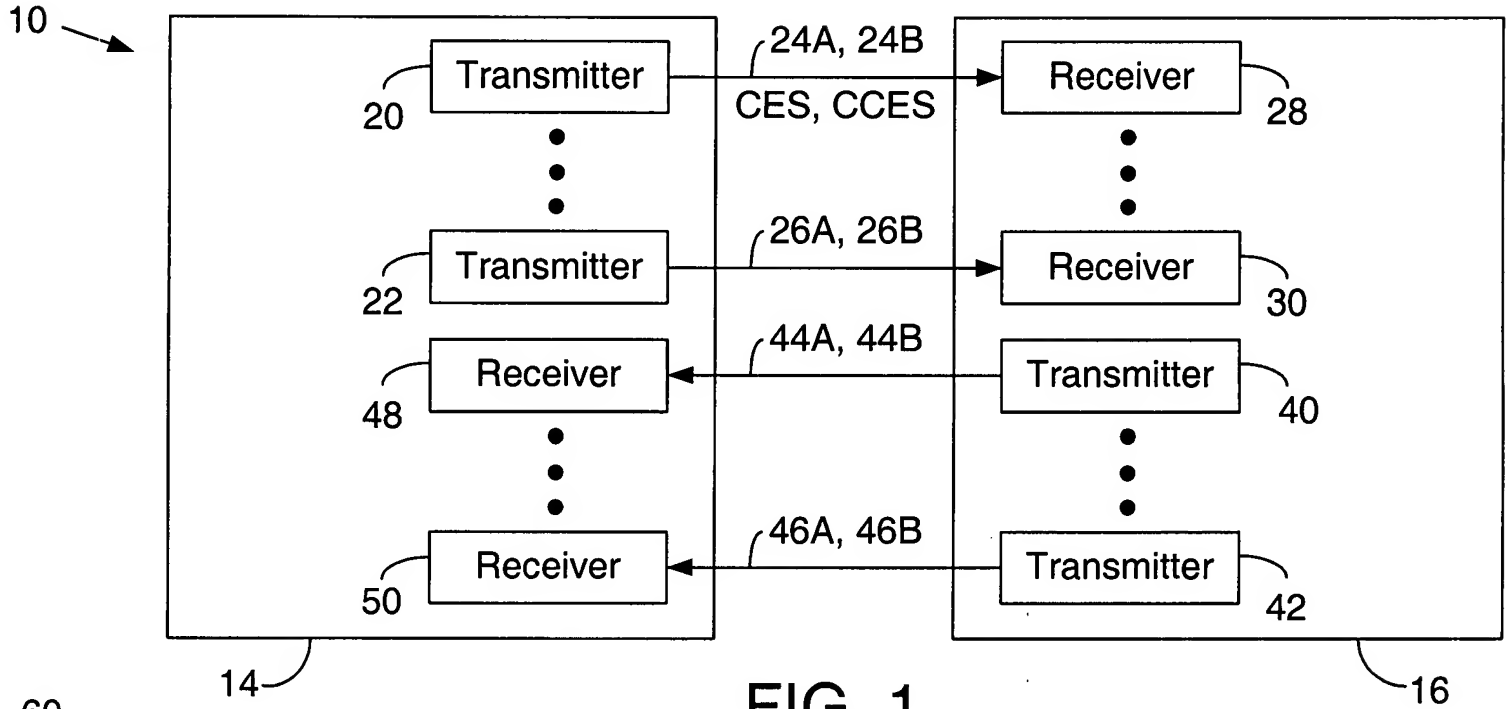
10
Transmitter
20
Transmitter
22
Receiver
48
Receiver
50
24A, 24B
CES, CCES
26A, 26B
44A, 44B
46A, 46B
Receiver
28
Receiver
30
Transmitter
40
Transmitter
42
14
16

FIG. 1

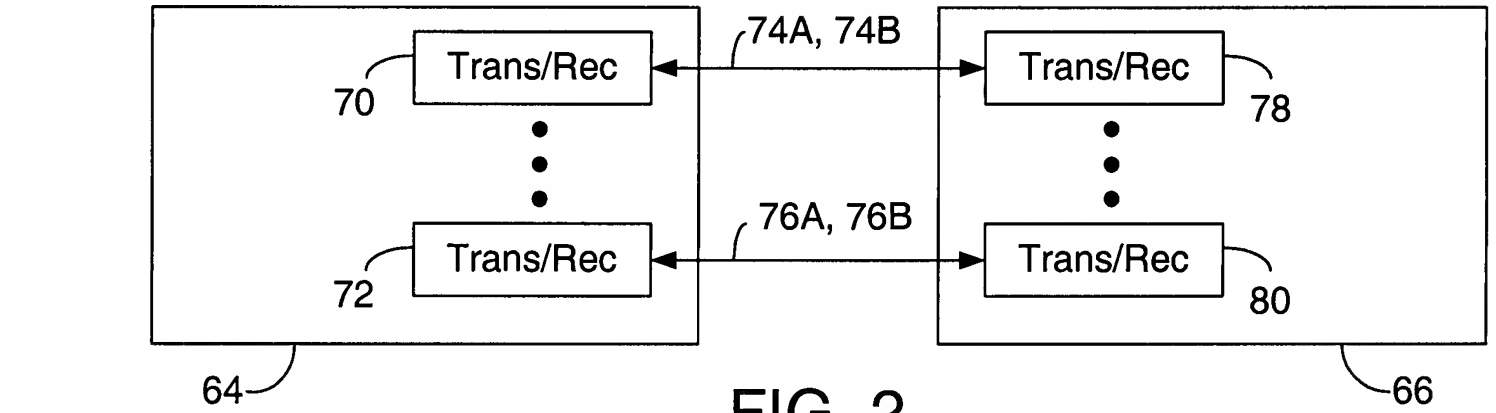
60
Trans/Rec
70
Trans/Rec
72
74A, 74B
76A, 76B
Trans/Rec
78
Trans/Rec
80
64
66

FIG. 2

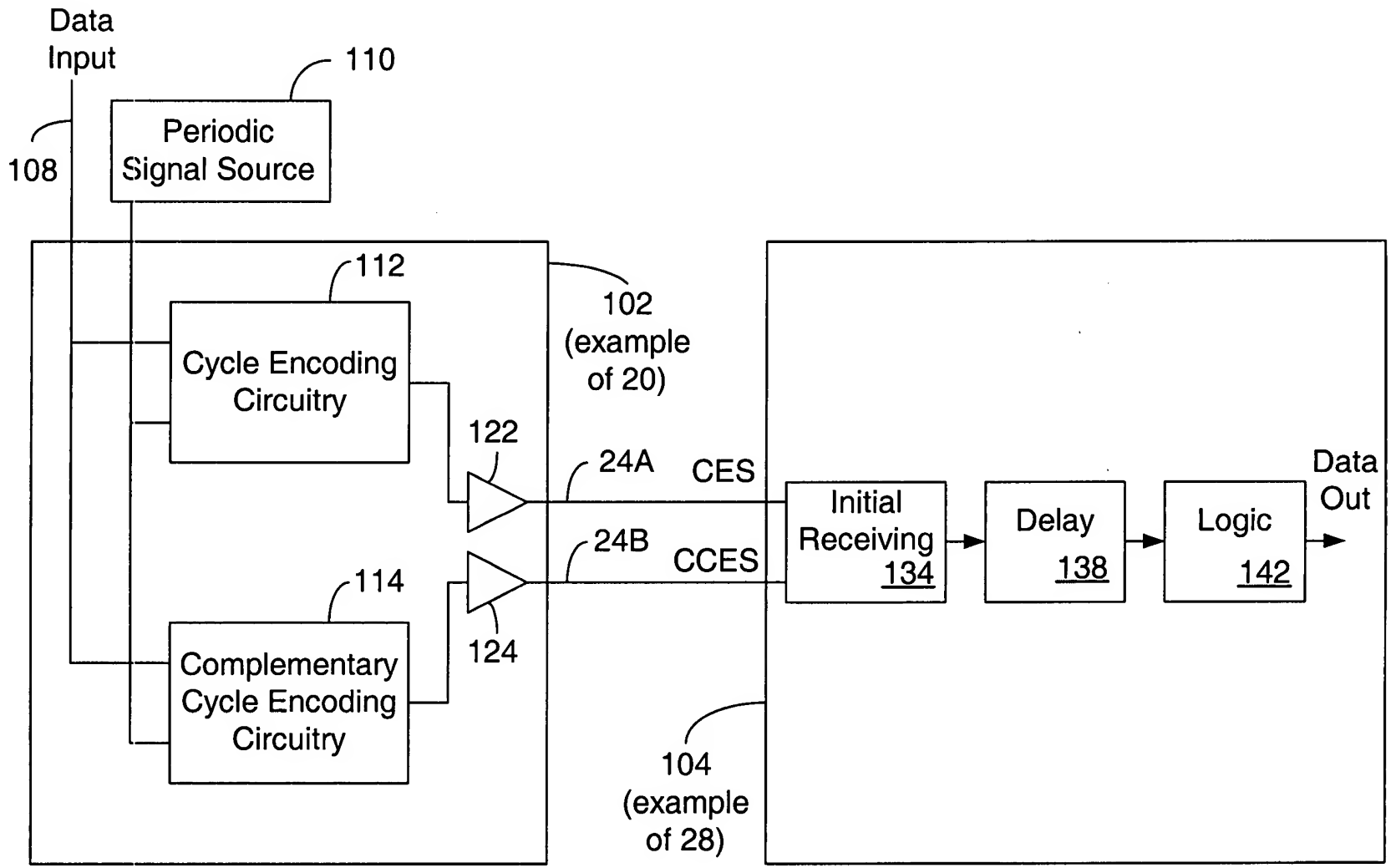
Data
Input
108
110
Periodic
Signal Source
112
Cycle Encoding
Circuitry
114
Complementary
Cycle Encoding
Circuitry
102
(example
of 20)
122
124
24A
CES
24B
CCES
Initial
Receiving
134
Delay
138
Logic
142
Data
Out
104
(example
of 28)

FIG. 3

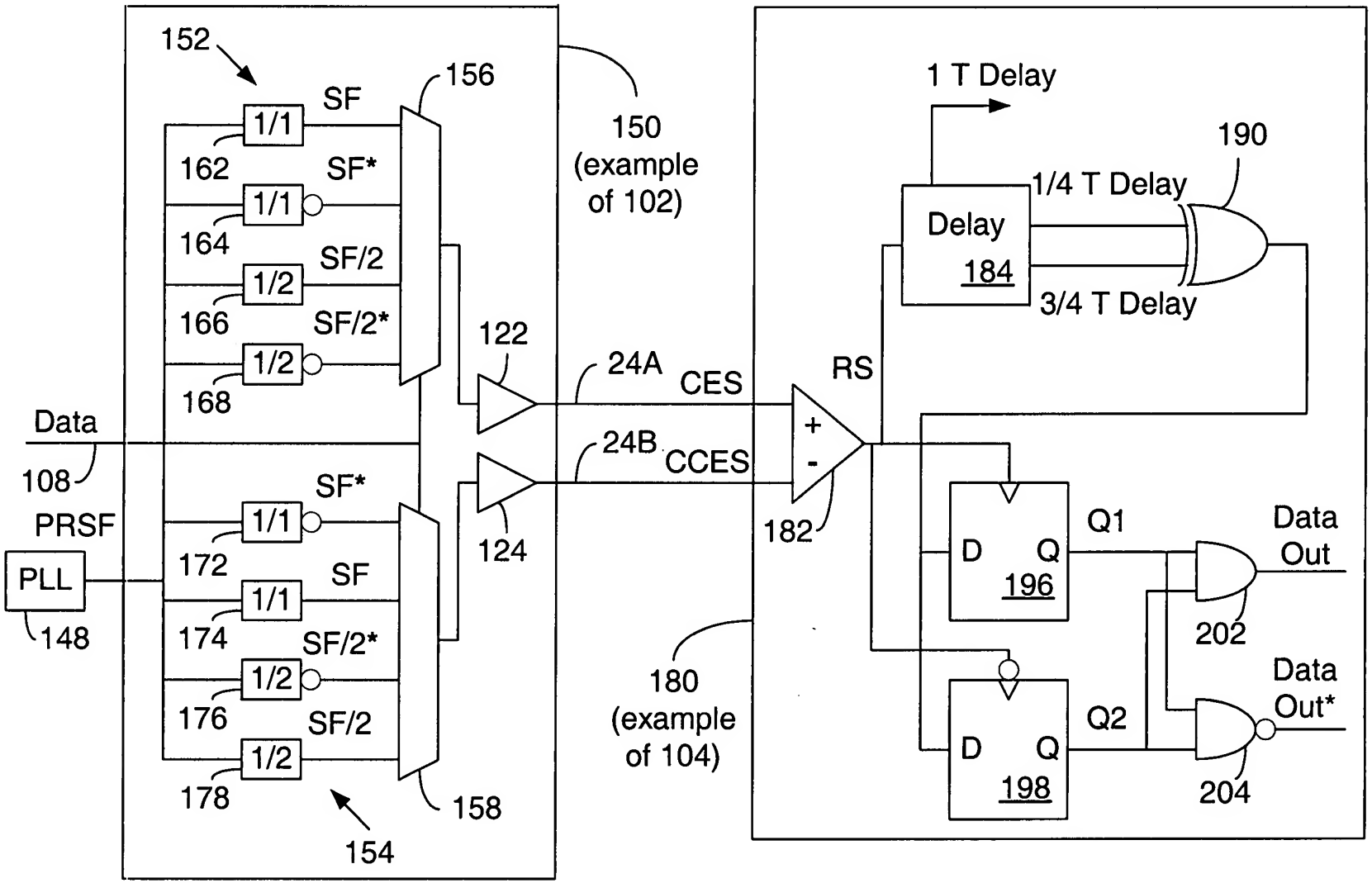
152
156
SF
1/1
162
SF*
1/1
164
SF/2
1/2
166
SF/2*
1/2
168
150
(example
of 102)
122
24A
CES
Data
108
24B
CCES
SF*
PRSF
1/1
172
PLL
148
SF
1/1
174
SF/2*
1/2
176
SF/2
1/2
178
124
158
154
180
(example
of 104)
RS
182
+
-
1 T Delay
190
1/4 T Delay
Delay
184
3/4 T Delay
D
Q
196
Q1
Data
Out
202
Data
Out*
D
Q
198
Q2
204

FIG. 4

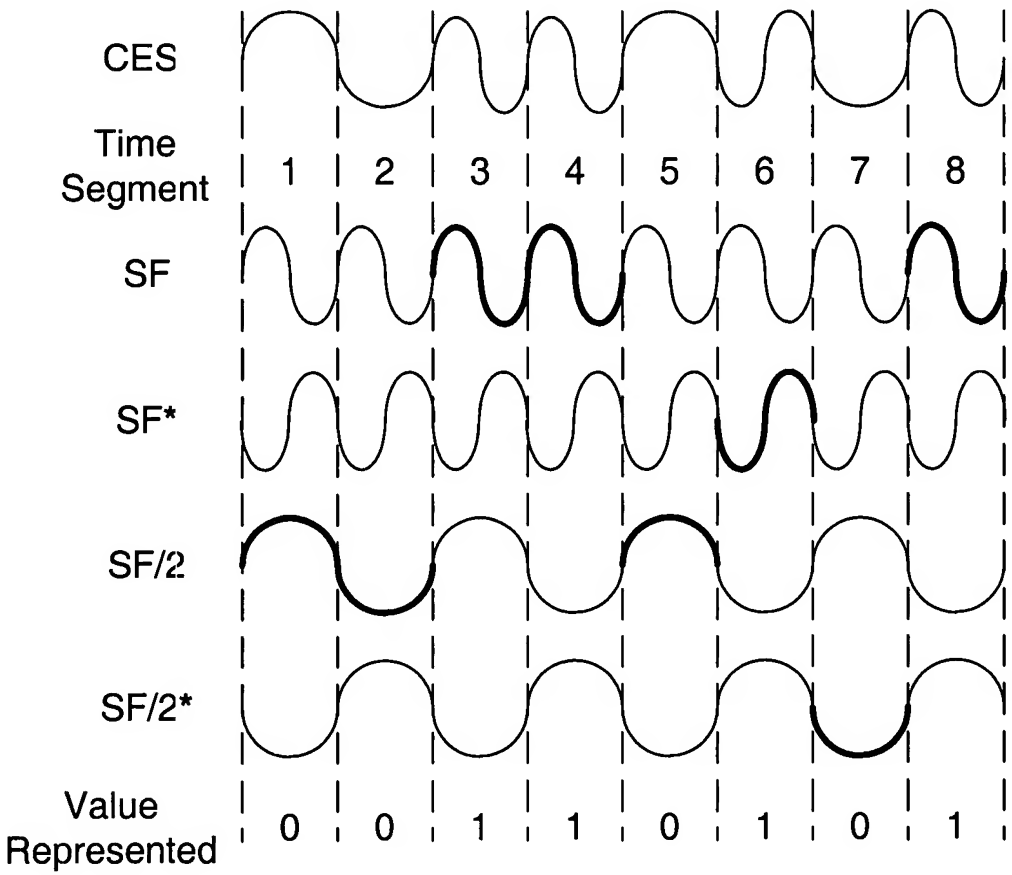

FIG. 5

Data	Signal in previous segment	Signal in response to data
0		
0		
0		
0		
1		
1		
1		
1		

FIG. 6

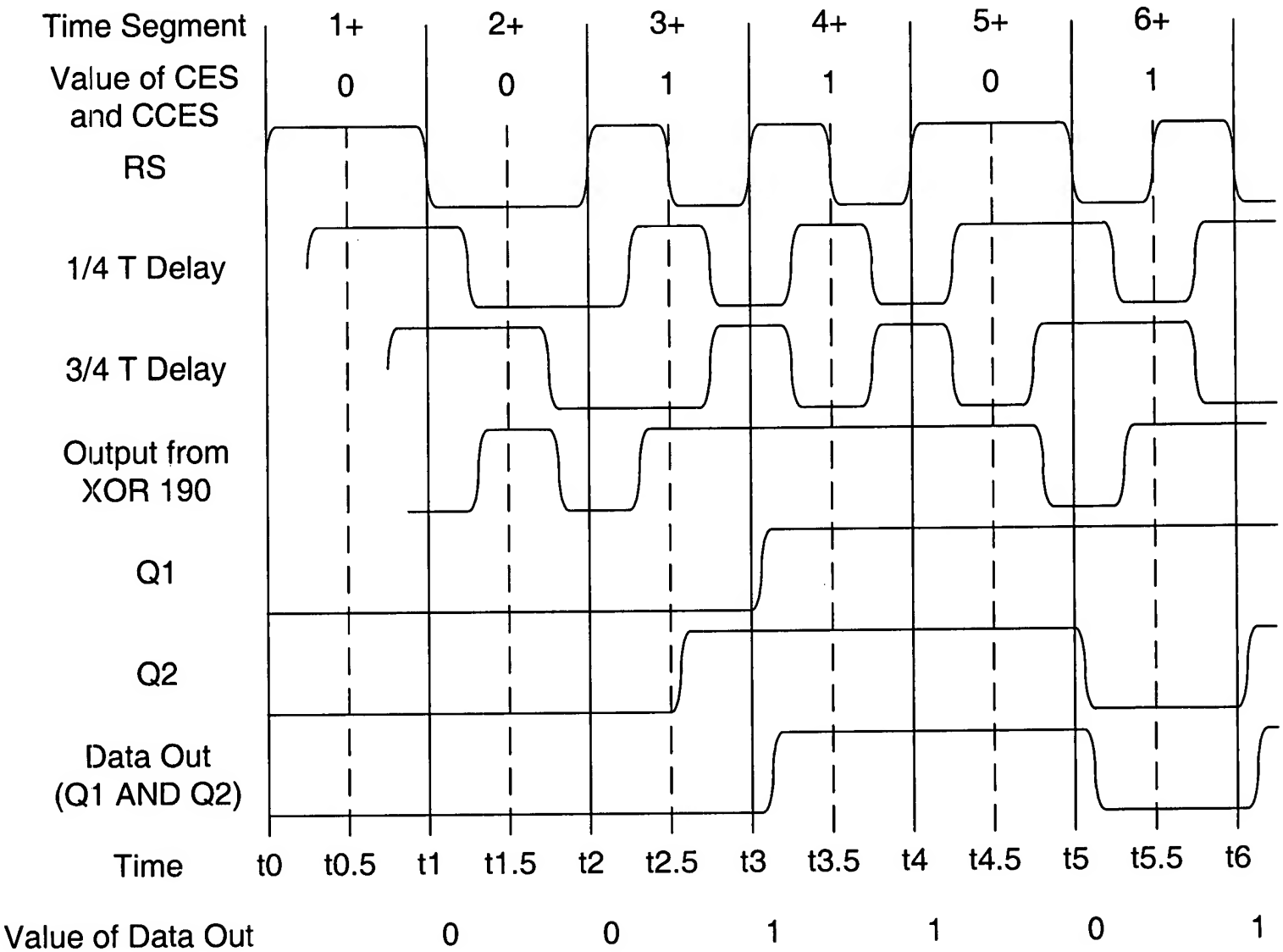
Time Segment
1+
2+
3+
4+
5+
6+
Value of CES and CCES
0
0
1
1
0
1
RS
1/4 T Delay
3/4 T Delay
Output from XOR 190
Q1
Q2
Data Out (Q1 AND Q2)
Time
t0
t0.5
t1
t1.5
t2
t2.5
t3
t3.5
t4
t4.5
t5
t5.5
t6
Value of Data Out
0
0
1
1
0
1

FIG. 7

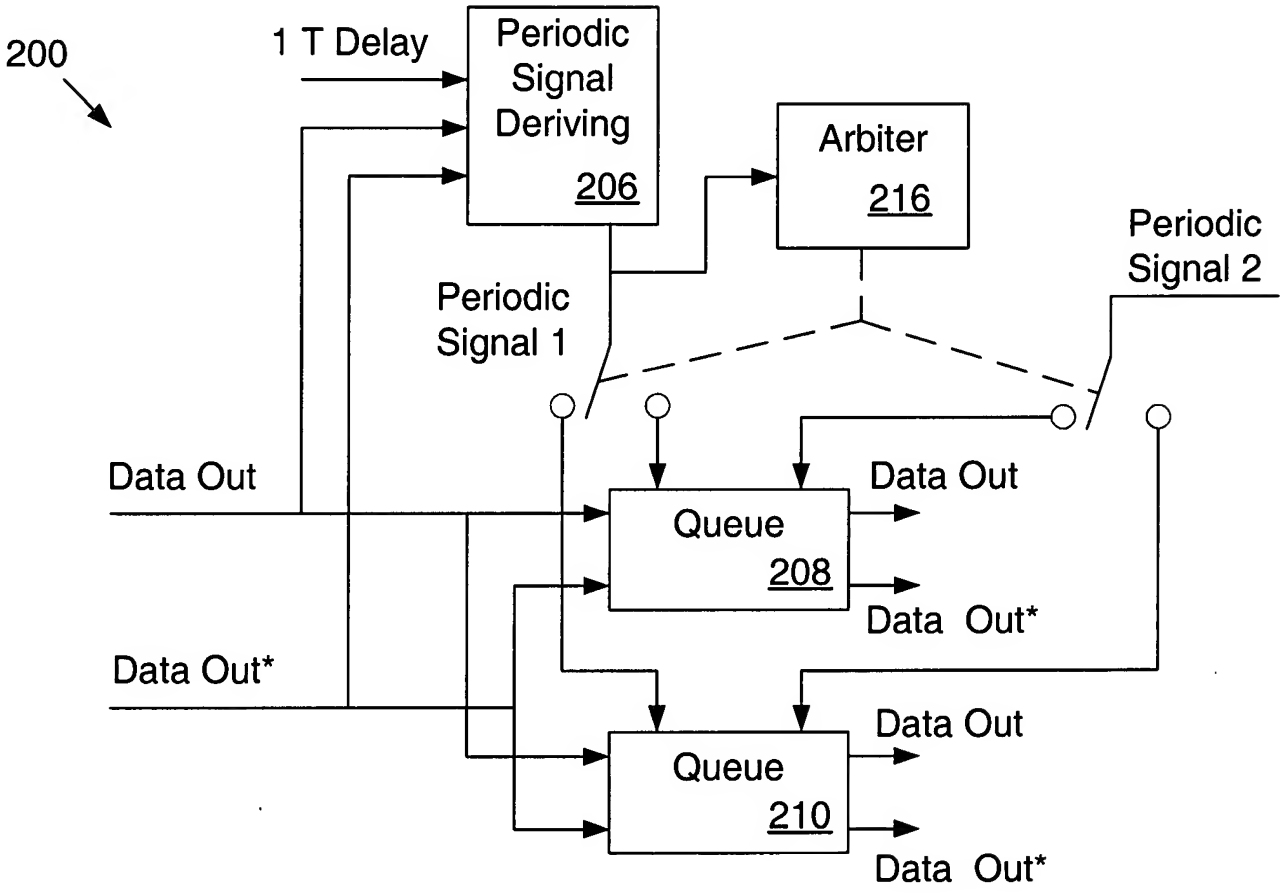
200
1 T Delay
Periodic Signal Deriving 206
Arbiter 216
Periodic Signal 2
Periodic Signal 1
Data Out
Queue 208
Data Out
Data Out*
Data Out*
Queue 210
Data Out
Data Out*

FIG. 8

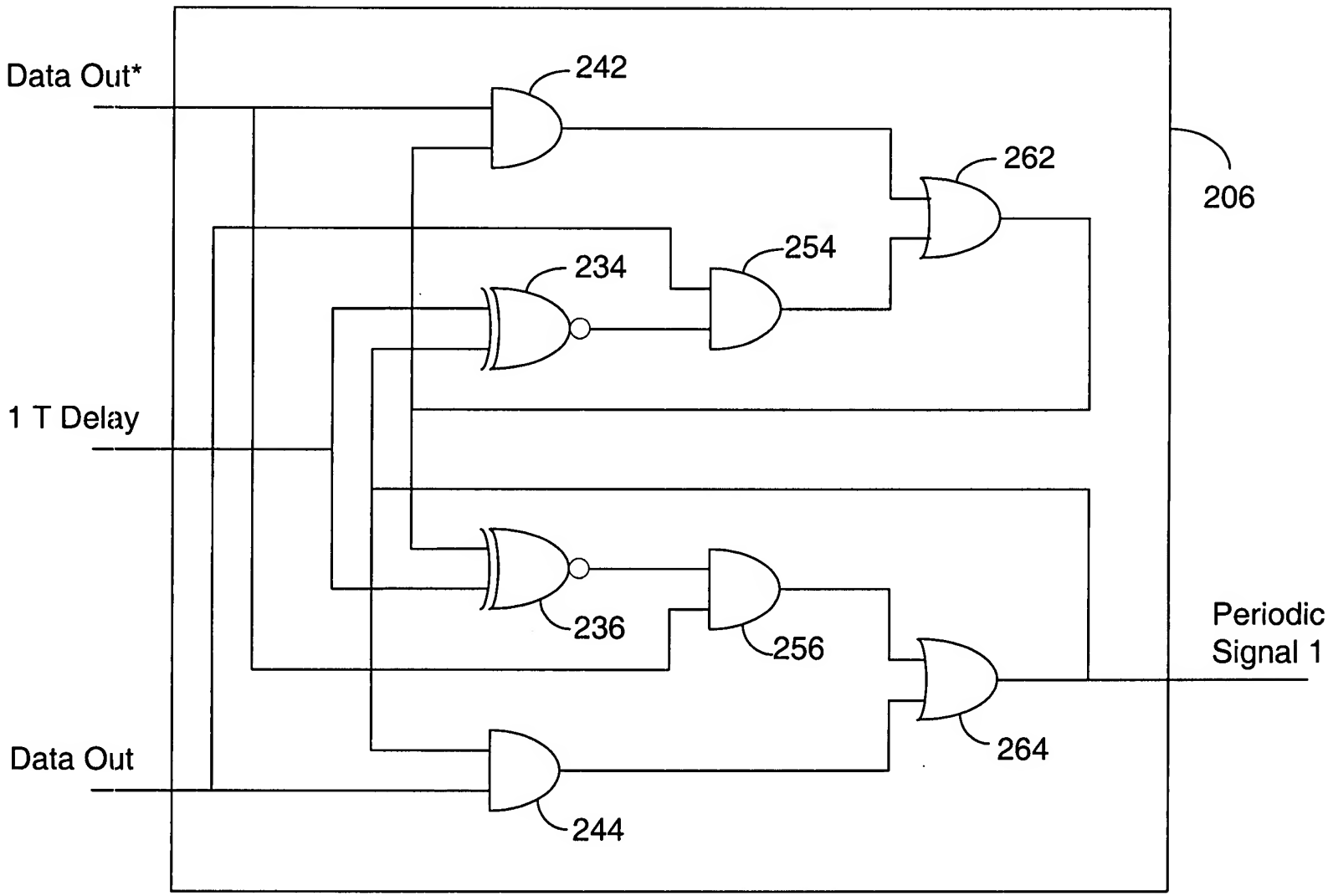
Data Out*
242
262
206
234
254
1 T Delay
236
256
Periodic
Signal 1
264
Data Out
244

FIG. 9

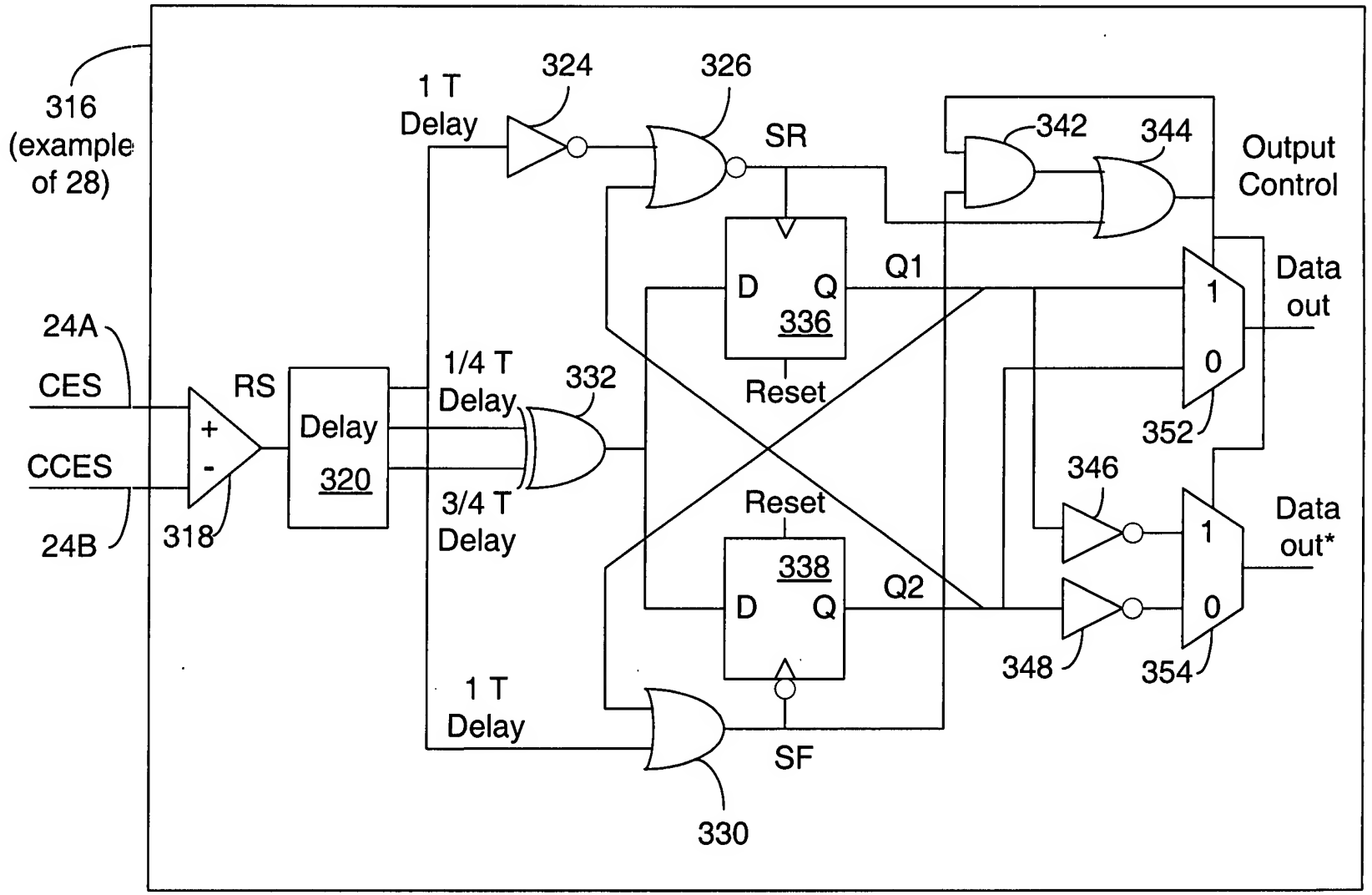
316
(example
of 28)
1 T
Delay
324
326
SR
342
344
Output
Control
D
Q
336
Q1
Data
out
24A
CES
CCES
24B
RS
+
-
318
Delay
320
1/4 T
Delay
3/4 T
Delay
332
Reset
352
346
Reset
338
D
Q
Q2
Data
out*
348
354
1 T
Delay
SF
330

FIG. 10

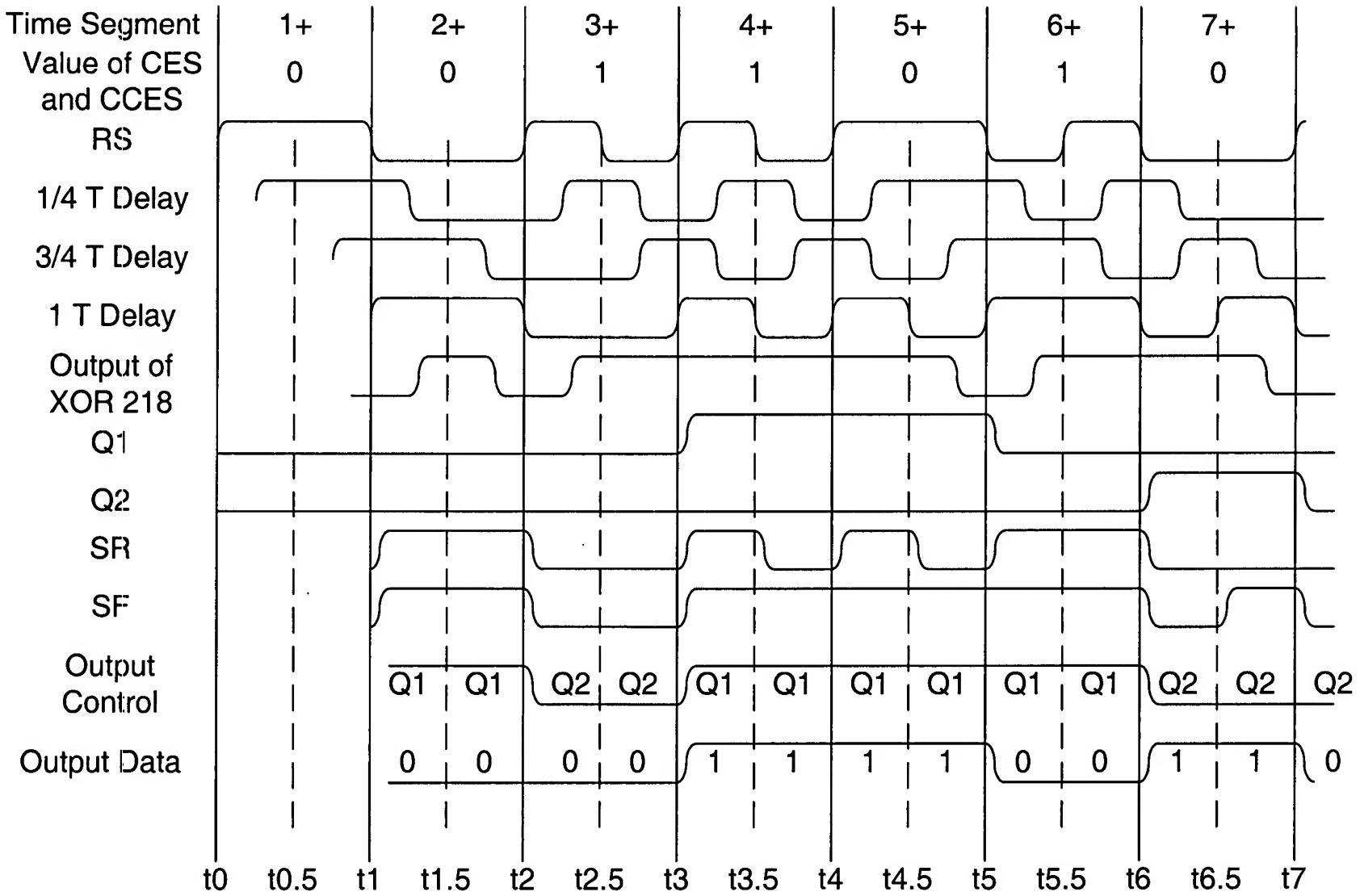
Time Segment
Value of CES and CCES
RS
1/4 T Delay
3/4 T Delay
1 T Delay
Output of XOR 218
Q1
Q2
SR
SF
Output Control
Output Data
1+
2+
3+
4+
5+
6+
7+
0
0
1
1
0
1
0
Q1 Q1 Q2 Q2 Q1 Q1 Q1 Q1 Q1 Q1 Q2 Q2 Q2
0 0 0 0 1 1 1 1 0 0 1 1 0
t0
t0.5
t1
t1.5
t2
t2.5
t3
t3.5
t4
t4.5
t5
t5.5
t6
t6.5
t7

FIG. 11

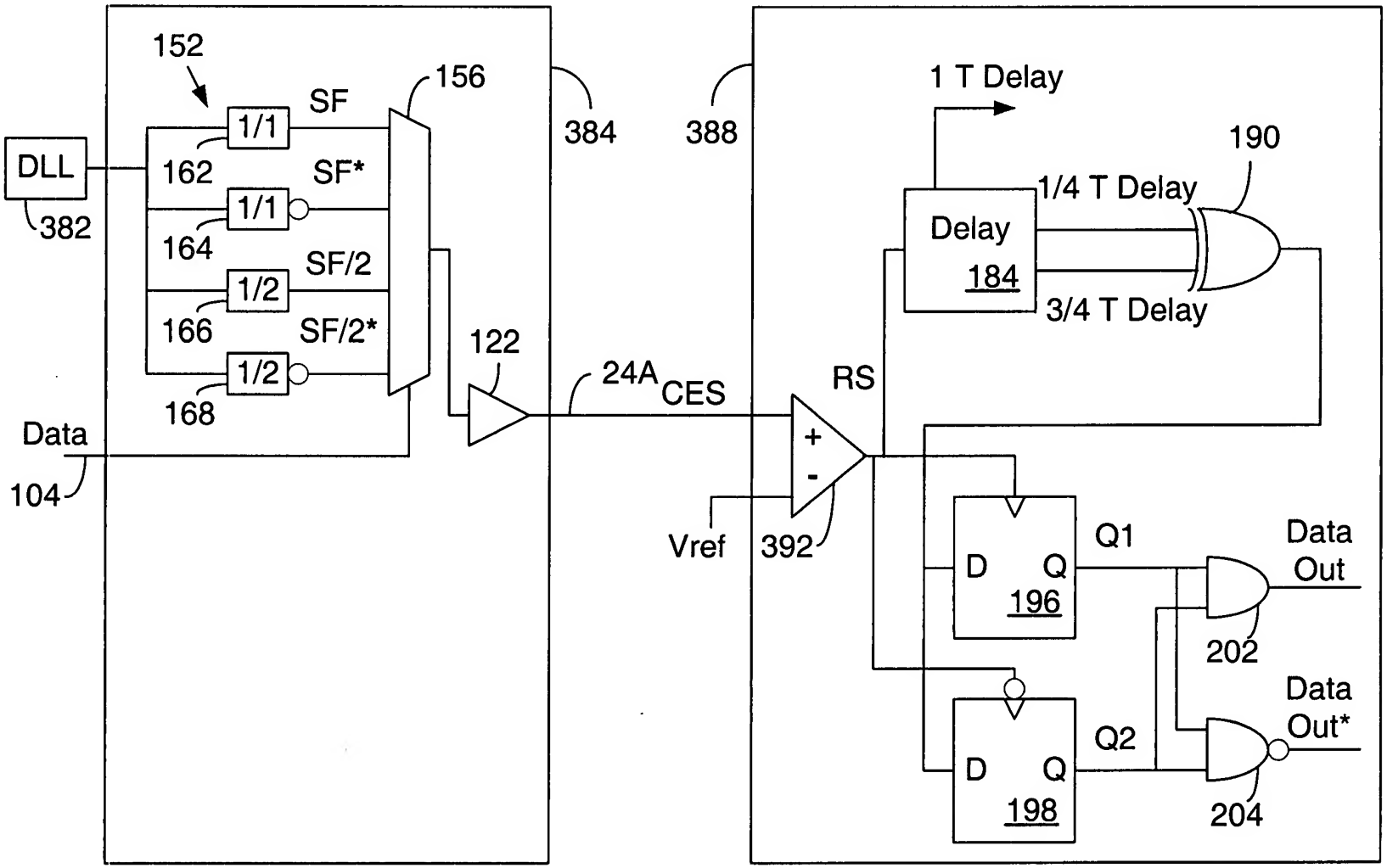
152
156
SF
1/1
DLL
162
SF*
1/1
382
164
SF/2
1/2
166
SF/2*
1/2
168
122
Data
104
384
388
1 T Delay
190
1/4 T Delay
Delay
184
3/4 T Delay
24A
CES
RS
+
-
Vref
392
D
Q
196
Q1
Data
Out
202
Data
Out*
Q2
D
Q
198
204

FIG. 12

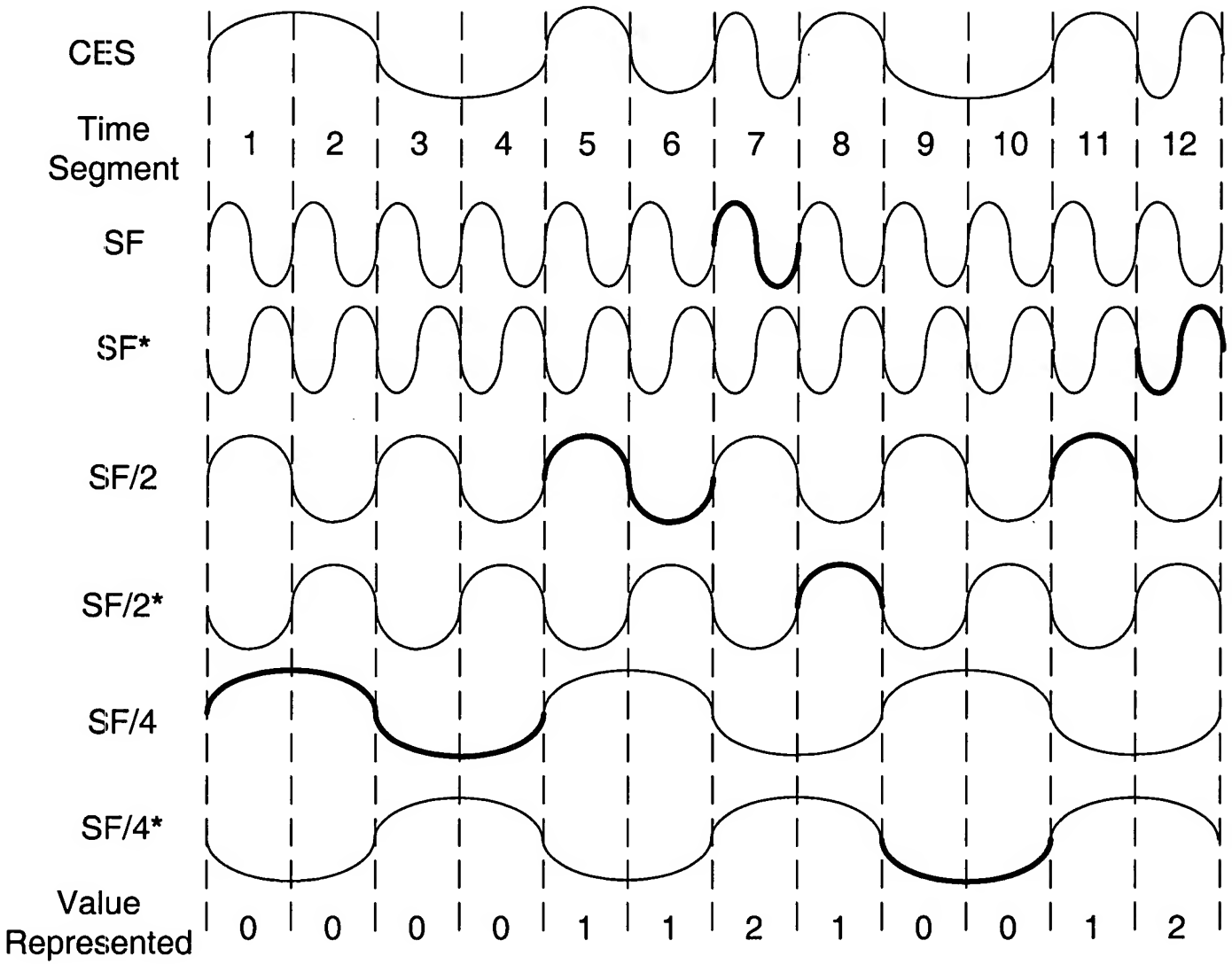
CES
Time Segment
1
2
3
4
5
6
7
8
9
10
11
12
SF
SF*
SF/2
SF/2*
SF/4
SF/4*
Value Represented
0
0
0
0
1
1
2
1
0
0
1
2

FIG. 13

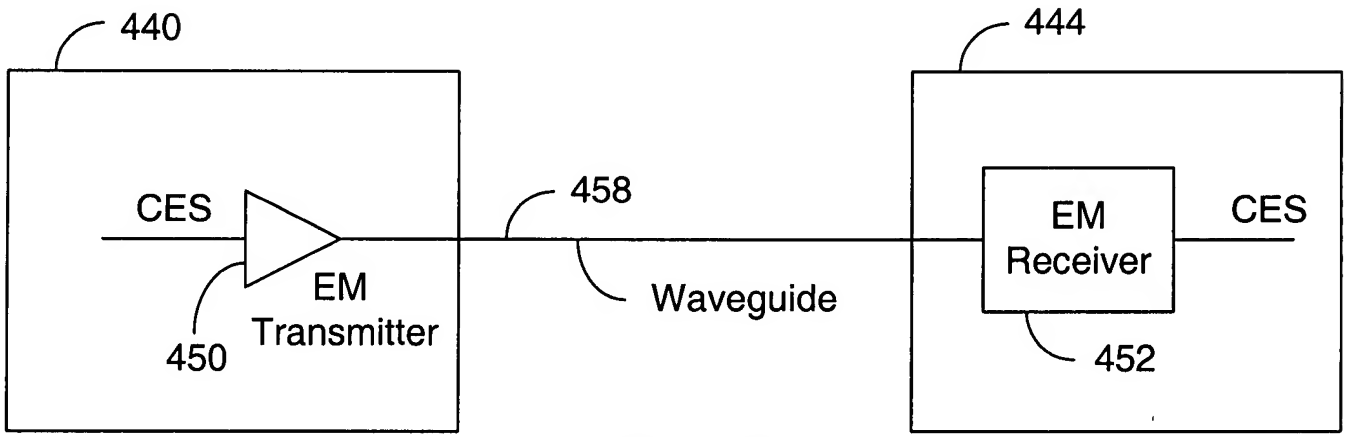
440
444
CES
458
EM
Receiver
CES
EM
Transmitter
Waveguide
450
452

FIG. 14

470
474
CES
EM
Receiver
CES
EM
476
Transmitter
478

FIG. 15